overlaps the central African breeding period, whilst the other (December and January) is a period when *pileata* is absent from central Africa.

There is of course no reason why defined subspecies of this wheatear should not be delineated in due course. The different populations certainly exhibit physiological differences since they are resident in the south western Cape, highly migratory over a great area of central Africa, and are presumably resident and have a double breeding period in Kenya. On account of the migratory habit over a wide area, non breeding birds or birds in post juvenile and post breeding moult collected in other parts of the total range cannot be assumed to be breeding birds of the locality in which they are collected. Clancey has drawn attention to anomalous specimens in South Africa which he suggests are migrants from other areas. This is possible; equally they may be aberrant individuals of a local population since individual variation is high. Consequently I believe that further light must be thrown on the winter quarters of the central African birds before any sound analysis of geographical variation can be attempted.

I am indebted to the National Museum, Bulawayo for the loan of a long series of specimens, and to Mr. C. W. Benson for examining them with me.

Albinistic patterning in the Mallard, Muscovy, Mandarin and Salvadori's Ducks

by James M. and Jeffery G. Harrison

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There appear to be certain latent recurring albinistic characters in some species of the *Anatidae*, which exhibit a linked association in some individuals. These characters show a constant symmetrical pattern, which argues that they are not just haphazard instances of the pied state, such as one would expect to result from the mating of a white with a normal individual; from such a mating the progeny usually exhibit pied mosaics and may be classed as accidental variation.

Illustrating this note are shown five instances of the condition in the Mallard, *Anas platyrhynchos platyrhynchos* Linnaeus, all of which are drakes. From these it is apparent that the condition is one of a varying degree of three distinct characters and that in all but the minimal, strikingly symmetrical white wing-tips combine to produce a remarkable variant.

The characters presented by the five specimens shown range from an entirely normally coloured individual (Fig. 1.[1]) except for the presence of a small white chin spot; the white semi-ring of the neck, which is such a familiar character of the Mallard drake is of normal extent. From this stage the variant passes through that condition shown by the next specimen (Fig. 1.[2]) in which both of these characters are seen in a more extensive form, and in which the longest, but not all of the primaries, are white. The next stage presents as an individual in which the chin spot and the white at the root of the neck are beginning to coalesce (Fig. 1.[3]), and in which all the primaries are white and part of the alula. From this stage the next (Fig. 1.[4]) is reached in which the lower half of the neck is white, and in the wings not only are all the primaries white, but also the secondaries forming the speculum, the alula and a few greater wing-coverts. In this

stage of the variant there is a striking similarity to the neck pattern of the adult drake Shoveler, *Anas clypeata* Linnaeus, which incidentally shows a white neck ring in some drakes in transition plumage from juvenile to first winter plumage, thus resembling the Mallard ([1]). Both these characters therefore demonstrate the close affinity existing between the Mallard and the Shoveler and fully support the suppression of the genus *Spatula* for the latter species.

The fully developed pattern of this Mallard variant is shown in Fig. 1.[5]. with virtually complete fusion of chin-spot and white at the root of the neck, with fully white primaries, alula and secondaries, though still with the majority of the wing-coverts normally coloured, as are the upperparts. The underparts as can be seen are somewhat leucistic over the belly. It is to be noted that specimens No. 2–5 have all arisen from normally coloured birds, which were placed on Bradbourne Lakes, Sevenoaks, approximately twenty years ago. No white "call-duck" have ever been put on to this water and the albinistic pattern has developed spontaneously, particularly during the past six years and presumably as the result of in-breeding, as the stock is very sedentary. We have other examples in both sexes and new ones occur annually. The first bird in the photograph was wild-shot by Dr. David Harrison at Otford, Kent.

As is well known in-breeding, without any special effort, and selective in-breeding in this species are both responsible for the production of variants of various kinds, including the so-called "Cayuja" Mallard and such types as the "pepper and salt" variety, isabelline and other leucistic varieties and a melanistic type. It is equally well known that many such varieties are of peculiarly local distribution owing to the fact that the Mallard in domestication is of singularly sedentary habit.

These conditions and results are readily understandable and in themselves might appear sufficient. However, when one realises that a precisely similar combination of homologous characters can occur in other species, then it is evident that this circumstance alone takes the phenomenon outside the category of accidental variation and stresses the desirability of further consideration.

The other species in which one or more of this set of homologous characters occur are the Mandarin Duck, *Aix galericulata* (Linnaeus), Salvadori's Duck, *Anas waigiuensis* Rothschild and Hartert, the domestic Muscovy Duck, *Cairina moschata* Linnaeus and the White-winged Wood Duck, *Cairina scutulata*, S. Müller, the European Green-winged Teal, *Anas c. crecca* Linnaeus, the Chilean Teal, *Anas f. flavirostris* Vieillot[2] and various diving duck, *Netta* and *Aythya* species, while one of us (J.G.H.[3]) recorded an instance of symmetrical white wings in a wild adult drake Goosander, *Mergus merganser merganser* (Linnaeus) which is the only instance of this particular variant known to us in the diving duck species.

The condition in the Mandarin is shown in the accompanying photograph. Both were bred in captivity by Dr. Edmund Gleadow and the drake shows a very distinctive white chin and neck spot corresponding to Stage 2 of the Mallard, while the duck corresponds to Stage 5 of the Mallard. Both of these Mandarins had white primaries on the unpinioned wing and would presumably have been symmetrical. We have a third example in an intersex, also from Dr. Gleadow.

The Muscovy Duck has become heavy and coarse under domestication and various colour changes have occurred. We have one example in which the head and neck corresponds closely to our Stage 5 of the Mallard and this bird also has several white primaries. Many Muscovy Ducks at the present time have totally white heads and necks and symmetrical white primaries.

The closely-related White-winged Wood Duck shows a vairable degree of whiteness on the head and neck, but in the majority there is a marked tendency for the white to concentrate into a neck ring and the chin in all fourteen wild-killed examples in the British Museum and in the two we have from the Wildfowl Trust is white. We have seen none with any trace of white primaries.

We have also examined ten examples of Salvadori's Duck, six were wild taken in New Guinea, now in the British Museum, three were from the Wildfowl Trust collection and the tenth was presented to us by the Wildfowl Trust. These last four birds were from the collection of Sir Edward Hallstrom at Nondugl and were presented by him to the Trust, with eleven others, some of which survive.

Two of the wild-taken females show traces of a white chin spot as does an adult drake in the Wildfowl Trust collection, but the adult drake presented to us shows both a white chin spot and a white neck spot, corresponding to the Mandarin drake illustrated.

As in the case of the Mallard, both Muscovy and Mandarin Ducks have come under domestication and all three are under the same artificial stresses. This may well apply to the rare Salvadori's Duck and we believe that it is under these circumstances that the remarkable and constant albinistic patterning becomes revealed, as the result of inbreeding.

At this point it is useful to enumerate the species in which the characters under discussion occur, either as part of a species' normal morphology or as a recurring homologous expression, examples of variants occurring in the wild state being marked with an asterisk.

(1) *Symmetrical white primaries.* These are found normally only in the swans* including the Black Swan, *Cygnus atratus* (Latham).

As a variant, this character is found in the Mallard*, Muscovy, Mandarin and Goosander*.

(2) *White chin spot.* This character is more widely distributed and is found as a constant character in the Ferruginous Duck*, *Aythya nyroca* (Güldenstädt). It is also present in a number of Tufted Duck*, *A. fuligula* (Linnaeus), Pochard*, *A. ferina* (Linnaeus), Scaup*, *A. marila* (Linnaeus) New Zealand Scaup, *A. novae-zeelandiae* (Gmelin) and the Red-crested Pochard*, *Netta rufina* (Pallas).

It is found as a variant character in the Mallard*, Salvadori's Duck*, Mandarin Duck and Muscovy Duck.

(3) *White neck spot.* In its strictest sense, this character is not found normally in any duck species, if one excludes the white semi-ring of the drake Mallard. It is our considered opinion that when seen in other species, the white neck spot is homologous to this character in the Mallard and this interpretation of it would infer that the Mallard is to be regarded as a species of considerable antiquity.

We have found white neck spots or semi-rings as variants in the following species:—

European Green-winged Teal*, Yellow-billed Teal*, Mandarin Duck, Gadwall*, *Anas strepera* Linnaeus[1], Salvadori's Duck, White-winged Wood Duck and Muscovy Duck. A white neck ring also occurs as a transient character in some eclipse drake Pintail*, *Anas acuta* Linnaeus and in immature to first winter drake Shoveler*, *Anas clypeata* Linnaeus.

(4) *The characters in combination.*

All three characters have only been found in combination in the Mallard, Muscovy Duck and Mandarin Duck. The white chin and neck spots are found in combination in these three and in Salvadori's Duck.

The development of the albinistic patterning is shown therefore to be a graduated phenomenon, associated with in-breeding in domestication, but also occurring to a lesser degree in the wild state.

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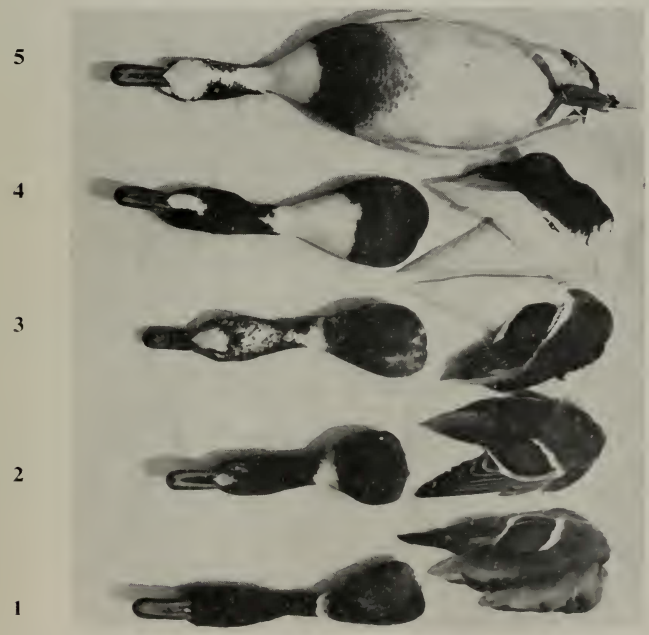

Fig. 1.—Albinistic Patterning in the Mallard
Lower bird:— 12th October, 1958; Otford, Kent.
All others:— 16th March, 1958; Sevenoaks, Kent.

Fig. 2.—Albinistic Patterning in the Mandarin

Left:— 25th February, 1961. 2nd year drake.
Right:— 26th February, 1961. 1st year duck.

permission to collect and study the Mallard on Bradbourne Lakes and Mrs. Pamela Harrison took the photographs for us. We are most grateful to them all.

Postscript

Since going to press, we have received a further drake Mandarin with white primaries from Dr. E. Gleadow, bred this year it is an immature drake Mallard, shot by Mr. J. Wilde on the Isle of Sheppey, Kent on 30th September, 1961, which has a white breast shield, but is otherwise in normal juvenile plumage. We are very grateful to both these gentlemen for the specimens.

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